

Analysis of HEPfolk 2007 Census

1. Methodology

Institutional contacts of the 153 institutions listed as receiving some DOE HEP and/or NSF EPP funding were notified by email of the census commencement on Feb 14, 2006. These contacts entered demographic information via a web form for all HEP physicists at their institution. We emphasize that the totals reported in the census are people, not full-time-equivalents. Near 100% compliance was achieved by mid-April.

2. Validation of 2007 Census

As soon as the Census deadline of March 30 passed, validation and consistency checking began. Of the 4573 people listed as current, there were 81 instances of the same person counted more than once. Most of these (49) are "features" not "bugs" in the sense that these people hold joint appointments. Examples are: 1) temporaries at DOE/NSF still active at their home institutions, 2) IAS/Princeton, 3) Fermilab/Chicago, 4) Bartol/Delaware. In addition, there were 30 mistakes, the most common being cases where a graduate student finishes and takes a job at a new institution but was still listed at their degree institution. These were repaired. The main conclusion is that the total counts are not equal to the number of heads at the approximately 1% level.

3. Analysis of 2007 Census

a. Historical trends

The historical trends by title are shown in Figure 2.

The trends broken down by institute and field are shown in Tables 1-6.

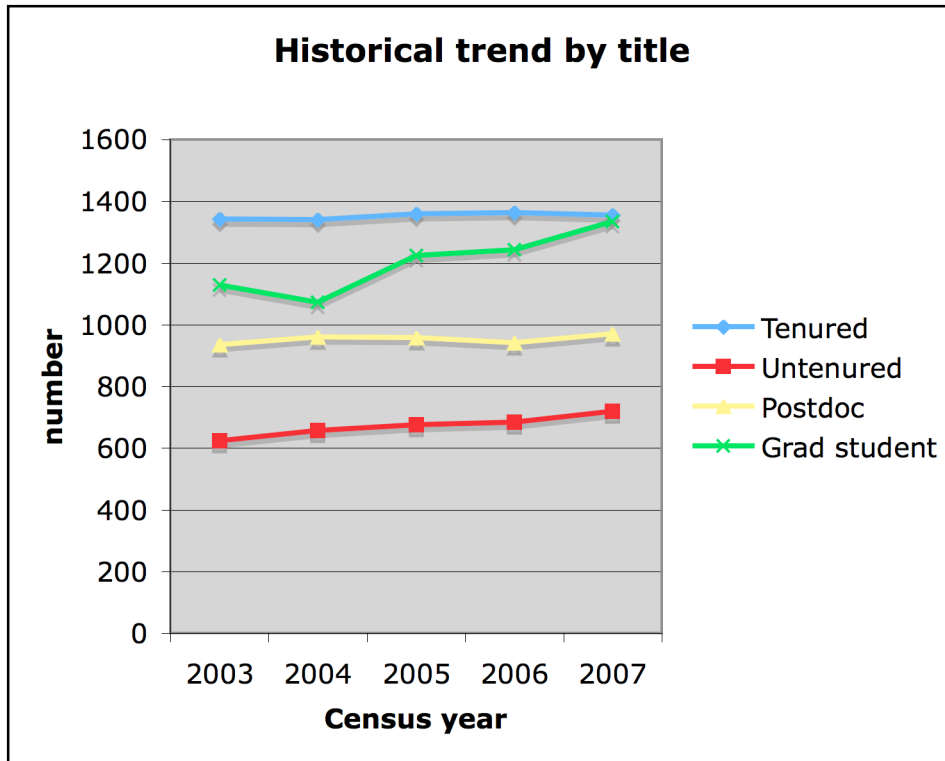


Figure 2. Number in each job category by year. Untenured combines Untenured Faculty and Open-term Research Staff. Postdoc includes Fixed-term Research Staff

Table 1: Historical trend for full field

| Full Summary | | | | | |
|---------------------|------|------|------|------|------|
| Number of | 2003 | 2004 | 2005 | 2006 | 2007 |
| Institutions | 156 | 156 | 153 | 156 | 153 |
| People | 4222 | 4218 | 4200 | 4415 | 4589 |

| Number with job title | 2003 | 2004 | 2005 | 2006 | 2007 |
|--------------------------------------|------|------|------|------|------|
| Retired faculty or staff | 187 | 185 | 199 | 208 | 208 |
| Tenured faculty or staff | 1343 | 1341 | 1359 | 1364 | 1355 |
| Untenured faculty | 228 | 242 | 255 | 261 | 284 |
| Untenured, open-term research staff | 396 | 415 | 421 | 422 | 436 |
| Postdoc or fixed-term research staff | 935 | 960 | 957 | 942 | 970 |
| Graduate student | 1129 | 1073 | 1223 | 1243 | 1335 |
| No title specified | 4 | 2 | 1 | 1 | 0 |

| Number with field (may select multiple) | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|
| Theory | 1292 | 1289 | 1390 | 1407 | 1414 |
| Experiment | 2555 | 2563 | 2634 | 2650 | 2783 |
| Accelerator | 487 | 467 | 498 | 494 | 517 |
| No field specified | 4 | 2 | 1 | 1 | 0 |

Table 2. Historical trend for Labs and Institutes (includes ANL, Bartol, BNL, FNAL, Institute for Advanced Study, Institute for Theoretical Physics, LBNL, LLNL, LANL, NASA Goddard, NASA Johnson, NSF, Naval Research Lab, Smithsonian, SLAC, and DOE)

| Labs or Institutes | | | | | |
|---------------------------|------|------|------|------|------|
| Number of | 2003 | 2004 | 2005 | 2006 | 2007 |
| Institutions | 13 | 13 | 14 | 14 | 16 |
| People | 1085 | 1077 | 1115 | 1086 | 1142 |

| Number with job title | 2003 | 2004 | 2005 | 2006 | 2007 |
|--------------------------------------|------|------|------|------|------|
| Retired faculty or staff | 69 | 63 | 69 | 74 | 76 |
| Tenured faculty or staff | 440 | 438 | 457 | 459 | 461 |
| Untenured faculty | 5 | 6 | 4 | 1 | 4 |
| Untenured, open-term research staff | 196 | 212 | 225 | 218 | 228 |
| Postdoc or fixed-term research staff | 304 | 301 | 284 | 279 | 303 |
| Graduate student | 71 | 57 | 76 | 55 | 70 |
| No title specified | 0 | 0 | 0 | 0 | 0 |

| Number with field (may select multiple) | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|
| Theory | 163 | 161 | 158 | 158 | 175 |
| Experiment | 620 | 637 | 663 | 641 | 689 |
| Accelerator | 344 | 321 | 341 | 332 | 335 |
| No field specified | 0 | 0 | 0 | 0 | 0 |

Table 3. Historical trend excluding Labs and Institutes (i.e., Universities)

| Labs or Institutes excluded | | | | | |
|------------------------------------|------|------|------|------|------|
| Number of | 2003 | 2004 | 2005 | 2006 | 2007 |
| Institutions | 143 | 143 | 139 | 142 | 137 |
| People | 3137 | 3141 | 3085 | 3329 | 3447 |

| Number with job title | 2003 | 2004 | 2005 | 2006 | 2007 |
|--------------------------------------|------|------|------|------|------|
| Retired faculty or staff | 118 | 122 | 130 | 134 | 132 |
| Tenured faculty or staff | 903 | 903 | 902 | 905 | 894 |
| Untenured faculty | 223 | 236 | 251 | 260 | 280 |
| Untenured, open-term research staff | 200 | 203 | 196 | 204 | 208 |
| Postdoc or fixed-term research staff | 631 | 659 | 673 | 663 | 667 |
| Graduate student | 1058 | 1016 | 1147 | 1188 | 1265 |
| No title specified | 4 | 2 | 1 | 1 | 0 |

| Number with field (may select multiple) | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|
| Theory | 1129 | 1128 | 1232 | 1252 | 1239 |
| Experiment | 1935 | 1926 | 1971 | 2012 | 2094 |
| Accelerator | 143 | 146 | 157 | 162 | 182 |
| No field specified | 4 | 2 | 1 | 1 | 0 |

Table 4. Historical trend for Theory.

| Theory field selected | | | | | |
|------------------------------|------|------|------|------|------|
| Number of | 2003 | 2004 | 2005 | 2006 | 2007 |
| Institutions | 126 | 126 | 126 | 128 | 127 |
| People | 1292 | 1289 | 1390 | 1407 | 1414 |

| Number with job title | 2003 | 2004 | 2005 | 2006 | 2007 |
|--------------------------------------|------|------|------|------|------|
| Retired faculty or staff | 56 | 62 | 65 | 71 | 72 |
| Tenured faculty or staff | 487 | 481 | 477 | 477 | 466 |
| Untenured faculty | 83 | 100 | 106 | 105 | 110 |
| Untenured, open-term research staff | 24 | 24 | 26 | 22 | 24 |
| Postdoc or fixed-term research staff | 236 | 238 | 256 | 245 | 247 |
| Graduate student | 406 | 384 | 245 | 487 | 495 |
| No title specified | 0 | 0 | 0 | 0 | 0 |

| Number with field (may select multiple) | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|
| Theory | 1292 | 1289 | 1390 | 1407 | 1414 |
| Experiment | 24 | 26 | 26 | 26 | 25 |
| Accelerator | 10 | 9 | 9 | 8 | 8 |
| No field specified | 0 | 0 | 0 | 0 | 0 |

Table 5. Historical trend for Experiment

| Experiment field selected | | | | | |
|----------------------------------|------|------|------|------|------|
| Number of | 2003 | 2004 | 2005 | 2006 | 2007 |
| Institutions | 129 | 129 | 129 | 132 | 132 |
| People | 2555 | 2563 | 2634 | 2650 | 2783 |

| Number with job title | 2003 | 2004 | 2005 | 2006 | 2007 |
|--------------------------------------|------|------|------|------|------|
| Retired faculty or staff | 121 | 115 | 124 | 126 | 122 |
| Tenured faculty or staff | 739 | 745 | 761 | 767 | 770 |
| Untenured faculty | 143 | 138 | 143 | 150 | 164 |
| Untenured, open-term research staff | 266 | 286 | 276 | 288 | 304 |
| Postdoc or fixed-term research staff | 607 | 637 | 627 | 617 | 639 |
| Graduate student | 679 | 642 | 703 | 702 | 784 |
| No title specified | 0 | 0 | 0 | 0 | 0 |

| Number with field (may select multiple) | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|
| Theory | 24 | 26 | 26 | 26 | 25 |
| Experiment | 2555 | 2563 | 2634 | 2650 | 2783 |
| Accelerator | 86 | 71 | 77 | 80 | 96 |
| No field specified | 0 | 0 | 0 | 0 | 0 |

Table 6. Historical trend for Accelerator

| Accelerator field selected | | | | | |
|-----------------------------------|------|------|------|------|------|
| Number of | 2003 | 2004 | 2005 | 2006 | 2007 |
| Institutions | 35 | 35 | 35 | 36 | 36 |
| People | 487 | 467 | 498 | 494 | 517 |

| Number with job title | 2003 | 2004 | 2005 | 2006 | 2007 |
|--------------------------------------|------|------|------|------|------|
| Retired faculty or staff | 18 | 16 | 18 | 18 | 22 |
| Tenured faculty or staff | 168 | 163 | 167 | 168 | 171 |
| Untenured faculty | 9 | 9 | 11 | 12 | 15 |
| Untenured, open-term research staff | 122 | 121 | 140 | 130 | 131 |
| Postdoc or fixed-term research staff | 111 | 99 | 90 | 91 | 100 |
| Graduate student | 59 | 59 | 72 | 75 | 77 |
| No title specified | 0 | 0 | 0 | 0 | 0 |

| Number with field (may select multiple) | 2003 | 2004 | 2005 | 2006 | 2007 |
|---|------|------|------|------|------|
| Theory | 10 | 9 | 9 | 8 | 8 |
| Experiment | 86 | 71 | 77 | 80 | 96 |
| Accelerator | 487 | 467 | 498 | 494 | 517 |
| No field specified | 0 | 0 | 0 | 0 | 0 |

b. Results for 2007 Census

The breakdown by PhD year for each job category is shown in Figures 3-5. The Tenured chart (Figure 3) shows a steady-state plateau of about 35 positions per PhD year (i.e., about 175 positions per 5-year bin). The Postdoc plus Fixed-term Research Staff (Figure 5) shows an approximately exponential decay (mean dwell time = 5 years) plus a long tail (106 people have PhD years earlier than 1995).

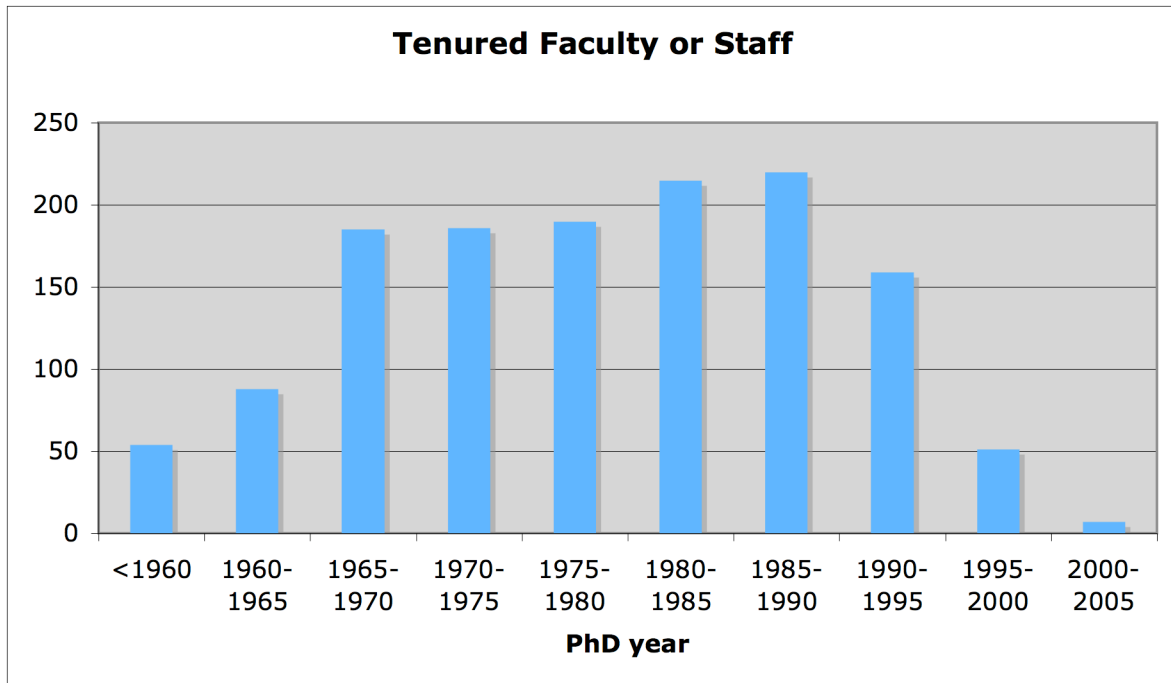


Figure 3. Tenured positions by PhD year

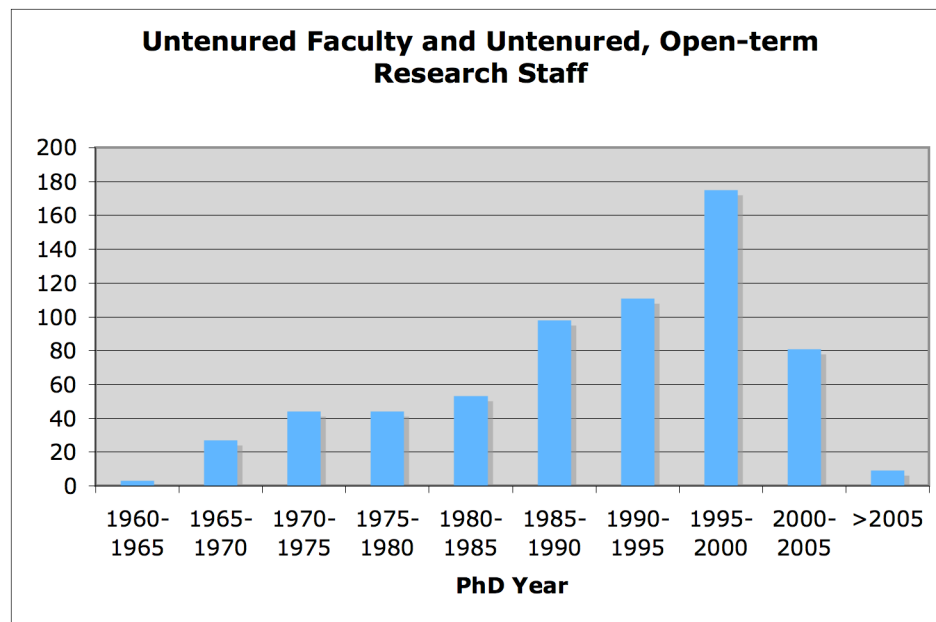


Figure 4. Untenured positions by PhD year

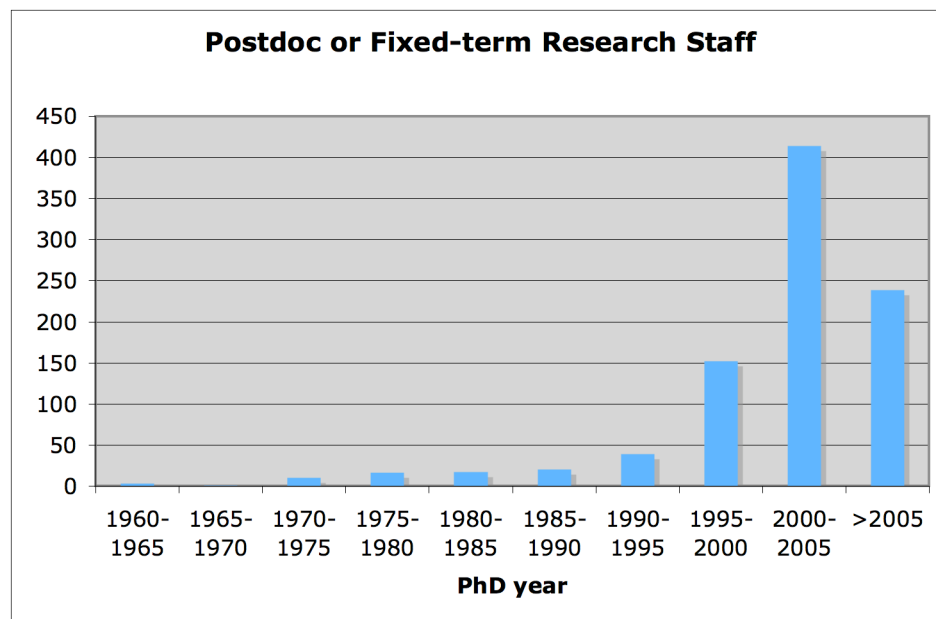


Figure 5. Postdoc or Fixed-term Research Staff by PhD year

The flow among the job categories is summarized in Figure 6. As a guide to following Figure 6, consider the Grad Student category. The broad arrow at the bottom indicates that 399 new graduate students entered in 2007. The arrow above the category shows that 126 students graduated and took a postdoc job at a US HEP institution. The smaller arrows to the side show that: 47 students took a job at a Foreign institutions, 102 took jobs either in industry or a non-HEP institution, and 58 left for either unknown or unspecified destinations.

Figure 6 shows a number of remarkable features:

- In spite of the approximately constant year-to-year sums, there is considerable movement in each year. It is as if there were an approximately fixed number of slots in each category with a “musical chair” exchange each year. The total movement is larger than shown in Figure 6 since lateral moves within a job category are not shown.
- The attrition rate is severe in moving up the job category pyramid. Less than 10% of entering graduate students can expect to achieve a tenured position in US HEP institutions.
- The Foreign Institutions are a crucial piece of the full picture. The flow between the US and Foreign institutions is approximately balanced.
- Industry and non-HEP institutions take up the attrition. The “non-HEP” component includes small US universities with no HEP program (typically teaching rather than research universities). The Demographics Committee asked that Industry and non-HEP academic be broken out. This is addressed in Table 7. Examples of ambiguous cases include “Computing”, “Medical Research”, ...
- The “Unknown/not specified” category is large enough to prevent very precise accounting of flow each year. Most instances in this category are cases where the information was not filled in. The problem is particularly acute in the case of entering graduate students where only 102 out of 399 students identified the previous institution, making separation into US and Foreign impossible. This will be an opportunity for a major improvement in the form for the 2008 Census.

Table 7. Breakout of Industry/non-HEP academic

| | Industry | Academic | Ambiguous |
|--------------|----------|----------|-----------|
| Grad Student | 51 | 36 | 15 |
| Postdoc | 21 | 14 | 2 |
| Untenured | 4 | 2 | 1 |

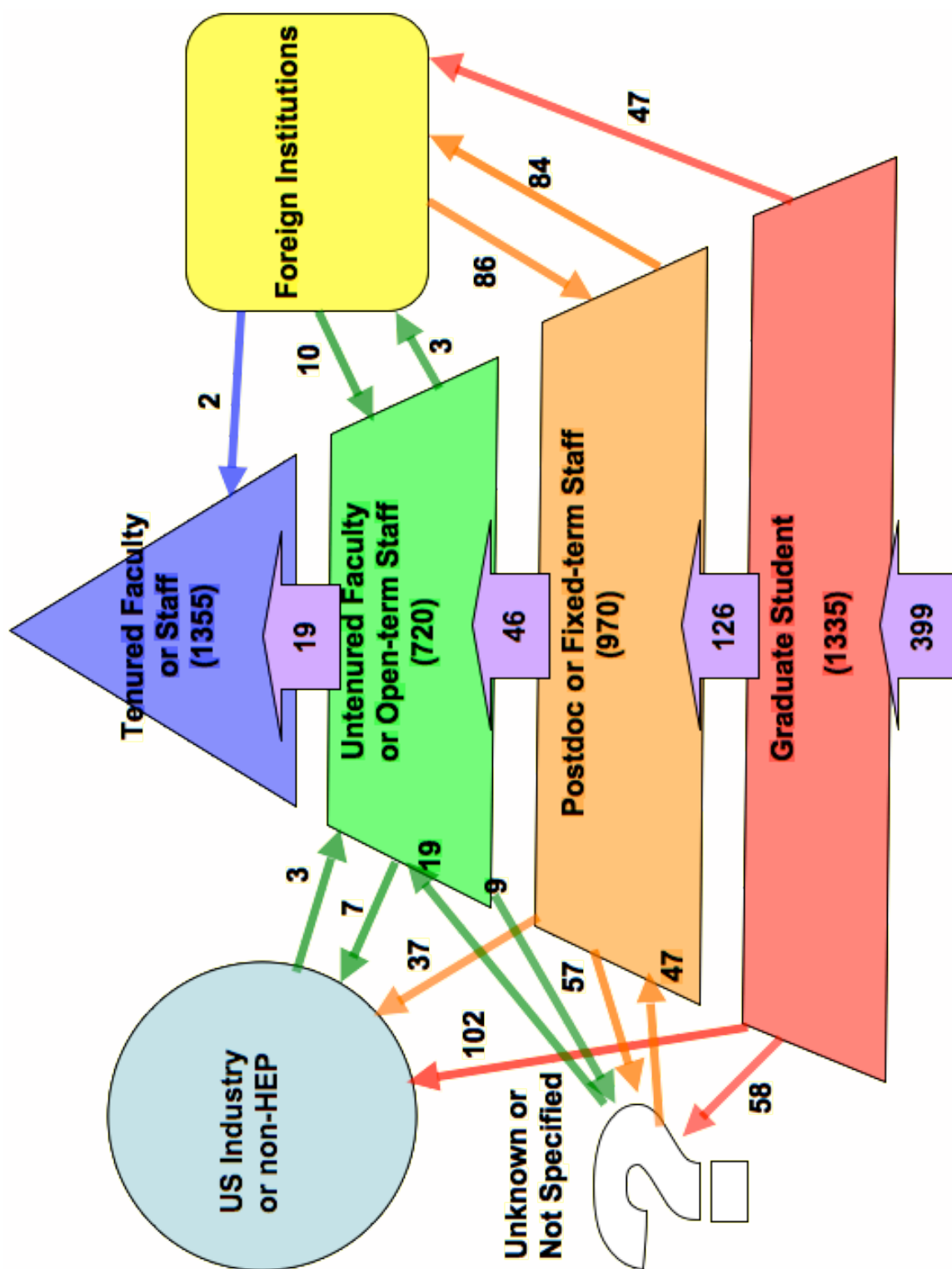


Figure 6. Flow among job categories